and *C. weiskei* (FULTON, 1902) are quite similar in shape, sculpture and form of the aperture to *Foxidonta stevensoni*. Possibly *Paratrochus dalbertsi* (BRAZIER, 1876) from Yule Island, New Guinea may prove to be related.

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Morphological and Behavioral Concealing Adaptations of *Lamellaria stearnsii*, a Marine Prosobranch Gastropod

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(Plate 16)

THE LAMELLARIIDAE are a family of mesogastropods which prey upon tunicates. Although a number of writers have remarked upon the close resemblance between lamellariids and the tunicates on which they feed (HERDMAN, 1893; ANKEL, 1935), there has been little consideration of the relationship of this similarity to other aspects of the biology of lamellariids, and knowledge of the natural history of these gastropods is largely confined to a single species, *Lamellaria perspicua* (LINNAEUS, 1758). The following is an account of a lamellariid occurring in Monterey Bay, California which displays a remarkable similarity to a tunicate.

Lamellaria stearnsii DALL, 1871 may be found on the compound ascidian *Tridemnum opacum* (RITTER, 1907), which occurs intertidally on the under surfaces of rocks. The snail's mantle almost covers the entire shell, and the animal is rather flat, so that it is shaped very much like a bulge in the tunicate colony (see plate 16). The pinkish-white color of the snail matches that of the tunicate closely, and the pattern of acid glands on the snail's dorsum closely resembles the pattern of oral apertures of the zooids. Finally, the siphonal notches of the snail may be compared to the common cloacal apertures of the tunicate.

The behavior of *Lamellaria stearnsii* includes further adaptations which render it inconspicuous. In the laboratory I have observed that the snails remain stationary on the tunicate during the day. If they are removed from the tunicate colony, they crawl about, displaying a pronounced negative phototaxis. Animals resting on a tunicate colony in the light become active at once when placed in the dark. These facts suggest that the snails are active only at night, and that they remain concealed on the tunicate colony during the day.

These concealing adaptations probably do not occur to an equal degree in all species of *Lamellaria*. MARCUS (1956) has denied the existence of a close association between tunicates and *Lamellaria perspicua mopisicolor*. I have collected *L. stearnsii* only on tunicates, but *L. rhombica* DALL, 1871, which also resembles a tunicate colony and which also occurs in Monterey Bay, is often found in more conspicuous positions.

In neither *Lamellaria stearnsii* nor *L. rhombica* is the shell completely internal, as has been reported for other species (FRETTER & GRAHAM, 1962, p. 555). Instead, the mantle covers the shell, but a small pore is left which enlarges to expose the shell when the animal is irritated. This pore was noted by ROGERS (1908) for *L. rhombica*, but not for *L. stearnsii*.

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Studies on the *Mytilus edulis* Community in Alamitos Bay, California: I. Development and Destruction of the Community[1]

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(5 Text figures)

INTRODUCTION

SCHEER (1945) STATED in his paper dealing with the development of marine fouling communities that it is important to distinguish between seasonal progression and true succession. He cited the work of MCDOUGALL (1943) at Beaufort, N. C. as an example of seasonal progression, and his work in Newport Bay, California, as true succession. He found experimental plates suspended during different times of the year went through the same sequence of development in forming the climax community of *Mytilus edulis* LINNAEUS, 1758.

The study of marine fouling organisms has attracted a considerable amount of attention throughout the world and especially along the Pacific Coast of North America. Much of the world data have been summarized in the U. S. Naval Institute publication on marine fouling (ANONYMOUS, 1952). Along the eastern Pacific Ocean studies have been conducted at Friday Harbor, Washington (JOHNSON & MILLER, 1935), San Francisco Bay (GRAHAM & GAY, 1945), Los Angeles - Long Beach Harbors (BARNARD, 1958; REISH, 1961 b), Newport Bay (SCHEER, 1945), La Jolla (COE & ALLEN, 1937; ALEEM, 1957), and San Diego Bay (WHEDON, 1937, 1943, in ANONYMOUS, 1952). In the majority of these studies, test panels were placed periodically in the sea in order to obtain data on the seasonal settlement of marine organisms. With the construction of a large boat harbor in Alamitos Bay in 1959, it was possible, in an area never before exposed to sea water, to determine whether or not the establishment of the *Mytilus edulis* community is a seasonal progression or a true succession.

MATERIALS AND METHODS

Alamitos Bay (Figure 1) is a small body of water located within the city of Long Beach, California, which is used primarily for recreational purposes. The details of the dredging and construction of the marina area of the bay have been described elsewhere (REISH, 1961 a, 1963).

In order to ascertain whether seasonal progression or true succession occurred, the study was conducted in two

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